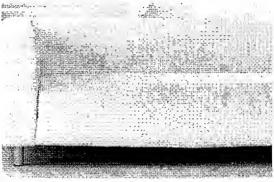
Exhibit 1

WASHINGTON, D.C.—About 13,000 chemists, physicists, and engineers gathered here from 28 August to 1 September to discuss research with applications including environmental protection, national security, and future energy sources.

Safer Alternative Could Replace Widespread Contaminant

Stain-resistant carpets, upholstery, and fabrics have a dark underside. A common coating that keeps them pristine has recently been found to break down into perfluorooctanoic acid, also known as PFOA or C8, a persistent compound that accumulates inside the body and has been fingered as a possible carcinogen. Manufacturers have been scrambling to come up with alternatives, but none could rival C8-producing stain fighters. At the American Chemical Society (ACS) meeting, however, chemists from the University of North Carolina, Chapel Hill (UNC-CH), unveiled an alternative that repels stains with the best of them but that breaks down into compounds that don't accumulate in the body.



Green clean. New polymers resist stains without breaking down into persistent compounds.

"It's a great step forward," says Tim Kropp, a toxicologist with the Environmental Working Group in Washington, D.C., who has closely followed C8 health concerns. Kropp notes that C8 is found in the blood of 96% of Americans and has been detected everywhere from the middle of the Pacific and Atlantic oceans to embedded in Arctic ice. Animal tests have suggested that the compound is a potential carcinogen, although that has yet to be confirmed in people. Still, the persistence of C8 has persuaded Canada to ban some of the compounds that break down to form C8 in the environment. C8 is also an industrial solvent in its own right, and manufacturers have begun to switch to other solvents and phase out its use. But many researchers suspect that textile and paper coatings, which are ubiquitous, are the largest environmental source of the chemical.

Current polymer fabric coatings owe their popularity to fluorine, an element that when added to polymers makes them strongly repel both water and oil. The polymers consist of a long hydrocarbon backbone bristling with innumerable fluorine-containing arms, each containing eight carbons. Over time, the arms can break off and react with oxygen to form C8. That compound has a combination of size and chemical behavior that makes it readily taken up in the body but difficult for the body to break down and eliminate, says Joseph DeSimone, a UNC-CH chemist who led the effort to develop the new alternative.

DeSimone says that about 2 years ago, he and Paul Resnick, a polymer chemist formerly with DuPont and now at UNC-CH, noticed animal studies that suggested that fluorinated hydrocarbons with four instead of eight carbon atoms in the chains don't persist in the body. So they set out to make one with good stain-resistant qualities. Researchers at 3M had commercialized fluoropolymers with four carbons in the side chains for use as manufacturing solvents. But those compounds, the UNC-CH researchers found, did not repel water and oil as well as the longer chain compounds did. Part of the problem, DeSimone notes, is that the shorter side chains don't pack tightly around the hydrocarbon backbone. As a result, the backbone can more easily interact with oil and water, thereby making the chemicals less repellent.

To get around this problem, Ji Guo, a Ph.D. student in DeSimone's lab, doctored the C4 side chains, outfitting each with an extra pair of hydrocarbon groups called methylenes. The methylenes, DeSimone says, encouraged the side chains to pack tightly together, making a more formidable barrier around the hydrocarbon backbone. Tests of the new materials showed that they repel oil and water almost identically to the longer-side-chained polymers, Guo says. But because the new coatings are made from polymers with shorter side chains, even if they break down over time, there is no way that they can generate C8. DeSimone says he and his colleagues have applied for patents on the new materials and have already had several discussions with textile manufacturers interested in the technology. Kropp says the new compounds must be tested to make sure there are no unforeseen problems. However, he adds, "it's always great to see scientists come up with an alternative to a problematic compound."

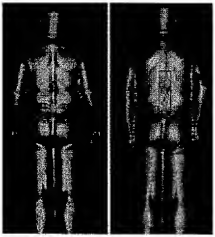
–ROBERT F. SERVICE

New Techniques Aim To Thwart Terrorists

In more than a dozen sessions at the ACS meeting dedicated to defense and homeland security, researchers presented technologies aimed at countering every imaginable terrorist threat—from devices for sensing explosives strapped onto the body of a suicide bomber to sensors capable of detecting microscopic quantities of biotoxins injected into a city's water supply.

Not surprisingly, many talks focused on transportation security. The tools currently available to screeners at airports and subway stations—metal detectors, x-ray scanners, sniffer dogs, and manual pat-downs—can't detect explosives or nonmetallic weapons concealed inside luggage or on the body of a passenger. Two technologies presented at the meeting offer a solution to those problems, although they both have a way to go before they can be deployed.

One, developed by David Sheen and his colleagues at Pacific Northwest National Laboratory in Seattle, Washington, uses electromagnetic radiation of millimeter wavelength to see through clothing and other barriers. Ranging between 30 and 300 gigahertz in fre-



Nailed. Millimeter waves spot plastic explosive strapped to a tester's spine (*right*).

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